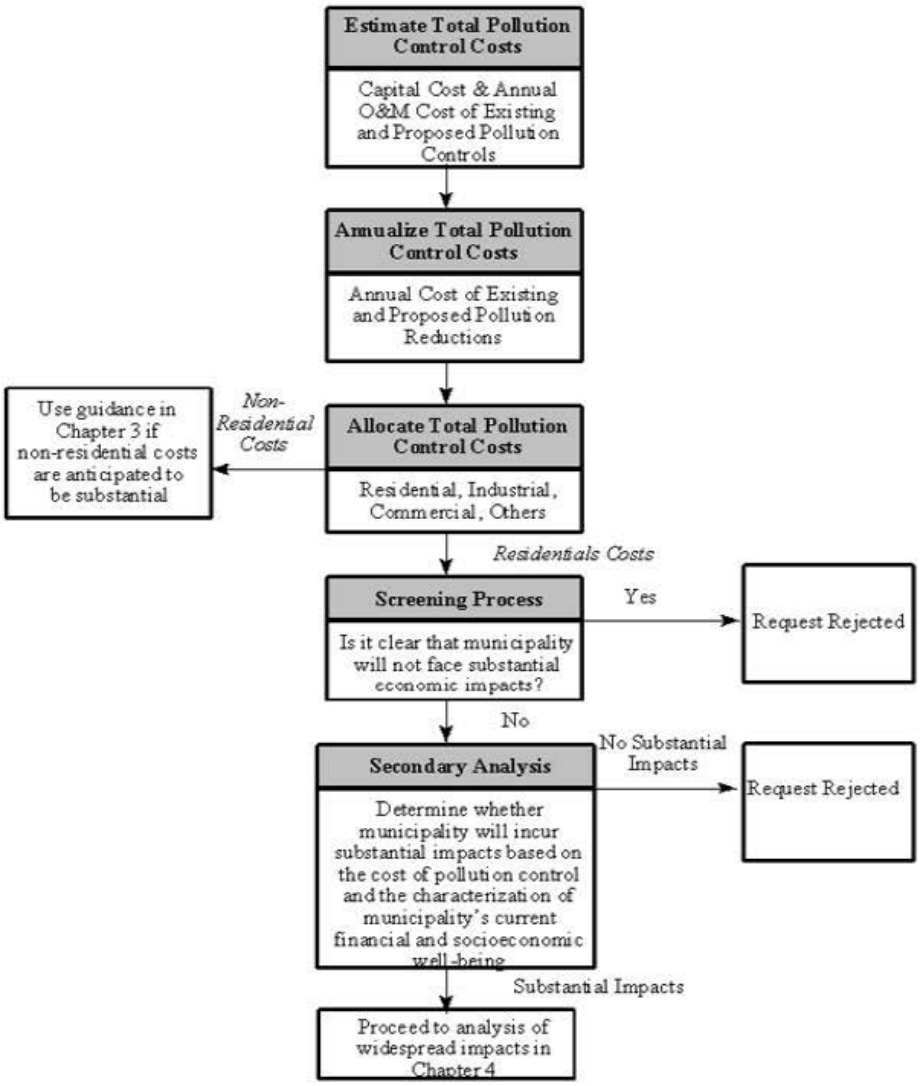
Instructions: Review the instructions below for an overview of each step that needs to be taken for the economic analysis of a public facility. Then, start at Worksheet A and work through each of the worksheets until you finish the analysis. For a Non-Degredation analysis, go directly to the last tab. The next tab--the 'Summary Worksheet' tab before Worksheet A--is to be filled out after you work through each worksheet in order to summarize your results.

Summarized below are the steps that need to be taken for the economic analysis of a public facility. Also provided to the right is a flowchart that summarizes those same steps. The complete EPA Guidance for Water Quality Standards can be found at http://www.epa.gov/waterscience/standards/econworkbook/

OVERALL STEPS SUMMARY	NOTES
Step 1: Verify Project Costs and Calculate the Annual Cost of the Pollution control project	
Step 2: Calculate Total Annualized Pollution Control Costs Per Household	
Step 3: Calculate and Evaluate the Municipal Preliminary Screener Score-- identifies only entities that can pay for sure	If the public entity passes a significant portion of the pollution control costs along to private facilities or firms, then the review procedures outlined in Chapter 3 of this workbook should also be consulted to determine the impact on the private entities.
Step 4: Apply the Secondary Test - This measurement incorporates a characterization of the community's current financial and socioeconomic well-being	The ability of a community to finance a project may be dependent upon existing financial coniditons within that community.
Step 5: Assess where the community falls in The Substantial Impacts Matrix - This matrix evaluates whether or not communities are expected to incur **substantial** economic impacts due to the implementation of the pollution control costs. If the applicant cannot demonstrate substantial impacts, then they will be required to meet existing water quality standards.	The evaluation of substantial impacts resulting from public entity compliance with water quality standards includes two elements, 1) financial impacts to the public entity and 2) current socioeconomic conditions of the community. Governments have the authority to levy taxes and distribute pollution control costs among households and businesses according to the tax base. Similarly, sewage authorities charge for services, and thus can recover pollution control costs through users fees. In both cases, a substantial impact will usually affect the wider community. Whether or not the community faces substantial impacts depends on both the cost of the pollution control and the general financial and economic health of the community.
Step 6: If impacts are expected to be substantial, then the applicant goes on to demonstrate whether they are also expected to be **widespread** (Go to "DEQ Widespread Criteria" tab)**.**	Estimated *changes* in socio-economic indicators will be used to determine whether widespread impact has occurred

Figure 2-1:
Measuring Substantial Impacts
(Public Entities)



Instructions: Fill out the Summary Worksheet below in order to summarize the results that you reach for each step for your analysis. This is help to give a simple overview of what you found out.

OVERALL STEPS SUMMARY

Step 1: Verify Project Costs and Calculate the Annual Cost of the Pollution control project	$17.86 million total in capital costs, $4.35 million in O&M costs /$5.7 million per year in annualized costs
Step 2: Calculate Total Annualized Pollution Control Costs Per Household	$379 per households for existing and new costs
Step 3: Calculate and Evaluate the Municipal Preliminary Screener Score-- identifies only entities that can pay for sure	1.13% for Missoula households which is in the Mid-range. We proceed to the secondary test.
Step 4: Apply the Secondary Test - This measurement incorporates a characterization of the community's current financial and socioeconomic well-being	The secondary score for Missoula came out to be 2.67 which is strong (Missoula has a strong financial and socioeconomic well-being
Step 5: Assess where the community falls in The Substantial Impacts Matrix - This matrix evaluates whether or not communities are expected to incur **substantial** economic impacts due to the implementation of the pollution control costs. If the applicant cannot demonstrate substantial impacts, then they will be required to meet existing water quality standards.	Missoula can afford to pay the water treatment costs according to the matrix. Thus, no variance should be given nor is the widespread test needed.
Step 6: If impacts are expected to be substantial, then the applicant goes on to demonstrate whether they are also expected to be **widespread** (Go to "DEQ Widespread Criteria" tab)**.**	The Widespread test is not necessary. However, it was run anyway, and it was determined that impacts would not be widespread.
Step 7: State the Final Concludsion	Missoula does not need a variance for their upgrade.

Worksheet A--Pollution Control Project Summary Info

For the purposes of this workbook, a **public entity** refers to any governmental unit that must comply with pollution control requirements in order to meet water quality standards. The most common example is a municipality or sewage authority operating a publicly owned treatment works (POTW) that must be upgraded or expanded. Municipalities, however, may also be required to control other point sources or nonpoint sources of pollution within their jurisdiction.

Note: The most cost effective project is preferred. Public entities should consider a broad range of discharge management options including pollution prevention, end-of-pipe treatment, and upgrades or additions to existing treatment. Specific types of pollution prevention activities that should be considered are found in Chapter 2 of the EPA Guidence.

Whatever the approach, the applicant must demonstrate that the proposed project is the most appropriate means of meeting water quality standards and must document project cost estimates. If at least one of the treatment alternatives that meets water quality standards will not have a substantial financial impact, then the community should not proceed with the analysis presented in the rest of this workbook.

Current Capacity of the Pollution Control System (skip this for Non-Deg)	20 MGD	
Design Capacity of the Pollution Control System	22 MGD	
Current Excess Capacity % (skip this for Non-Deg)		10%
Expected Excess Capacity after Completion of Project %		75%
Projected Groundbreaking Date		Jan-09
Projected Date of Completion		Jan-10

Please describe the pollution control project being proposed and how the project meets water quality standards:	Expand tertiary treatment of the current plant and capture the methane to help power a turbine that brings down plant electricity bills. This will help give the plant additional capacity for an expanding Missoula population, and allow it to still meet nutrient standards.
Please describe the other pollution control options considered, explaining why each option was rejected. Explain how each alternative would have met water quality standards.	Build a second plant on the west side of town rather than expand current system--this was more expensive and less efficient and required a lot of new large water pipe to be installed
Is the proposed project the least expensive that can be used to meet the water quality standards goals? If not, give reasons why it is not.	Yes

Worksheet B-Calculation of Total Annualized Project Costs

Note: The capital portion of project costs is typically financed over approximately 20 years, by issuing a municipal debt instrument such as a general obligation bond or a revenue bond. Local governments may also finance capital costs using bank loans, state infrastructure loans (revolving funds), or federal subsidized loans (such as those offered by the Farmers Home Administation)

If project costs were estimated for some prior year, these costs should be adjusted upward to reflect current year prices using the average annual national Consumer Price Index (CPI) inflation rate for the period

Capital Cost of Project	$20,000,000	
Other One-Time Costs of Project (Please List, if any):	$0	
New pipe installed	$2,000,000	
Capture of methane and turbine	$800,000	
New wiring at plant	$60,000	
	$0	
Total Capital Costs (Sum column) $ (1)	$22,860,000	
Portion of Capital Costs to be Paid for with Grant Monies $ (2) (Paul)	$2,000,000	This should be a realistic amount and should be identical to financing plans identified in the PER
Capital Costs to be Financed [Calculate: (1) - (2)] $ (3)	$20,860,000	
Type of financing (e.g., G.O. bond, revenue bond, bank loan)		
Interest Rate for Financing (expressed as decimal) (i)	0.06	The interest rate should reflect the type of debt instrument likely to be used.
Time Period of Financing (in years) (n)	20	
Annualization Factor =i/ [[(1+i)to nth power -1]+i] n 1]+i(or see Appendix B) (4)	0.087184557	loan coverage should be included - this applies to revenue bonds and varies between 110 to 125% depending on funding source. SRF is 125%
Annualized Capital Cost [Calculate: (3) x (4)] (5)	$1,818,670	
B. Operating and Maintenance Costs		
Annual Costs of Operation and Maintenance (including but not limited to:	$4,350,000	
monitoring, inspection,permitting fees, waste disposal charges, repair,	$0	
administration and replacement.) (Please list below and state in terms of	$0	
dollars per year)	$0	
Total Annual O & M Costs (Sum column) $ (6)	$4,350,000	
C. Total Annual Cost of Pollution Control Project		
Total Annual Cost of Pollution Control Project [(5) + (6)] $ (7)	$6,168,670	

Loan coverage is the annual debt multiplied by some factor to account for nonpayment - I've only seen it applied to revenue bonds because GO bonds are tax-backed. The two main loan funding sources are Rural Development (U.S. Dept. of Ag.) - they require 115% coverage - I think - and SRF. We require 125% coverage on all revenue bonds.

Worksheet C-Calculation of Total Annual Pollution Control Costs Per Household

A. Current Pollution Control Costs:

Current sewer rate

Total Annual Cost of Existing Pollution Control $ (1)	$6,400,000
Amount of Existing Costs Paid By Households $ (2)	$6,400,000
Percent of Existing Costs Paid By Households %(3)	100.00%
Number of Households* (4)	32,000
Annual Cost Per Household [Calculate: (2)/(4)] $ (5)	$200

* Do not use number of hook-ups.

B. New Pollution Control Costs

Are households expected to provide revenues for the new pollution control project in the same proportion that they support existing pollution control? (Check a, b or c and continue as directed.)

a) Yes [fill in percent from (3)] percent.(6a)	100.00%
b) No, they are expected to pay _____ percent.(6b)	_____
c) No, they are expected to pay based on flow. (Continue on Worksheet C, Option A--See below)	_____

Total Annual Cost of Pollution Control Project [Line (7), Worksheet B] $ (7)	$6,168,670
Proportion of Costs Households Are Expected to Pay [(6a) or (6b)] (8)	100.00%
Amount to Be Paid By Households [Calculate: (7) x (8)] $ (9)	$6,168,670

Annual Cost per Household [Calculate: (9)/(4)] $ (10) $193

C. Total Annual Pollution Control Cost Per Household

Total Annual Cost of Pollution Control Per Household (5) + (10) $ (11) $393

Worksheet C: Option A---Flow based (Not Applicable for Missoula)

Calculation of Total Annual Pollution Control Costs Per Household--Flow based

A. Calculating Project Costs Incurred By Households Based on Flow

Expected Total Usage of Project (eg. MGD for Wastewater Treatment)	_____	(1)
Usage due to Household Use (MGD of Household Wastewater)	_____	(2)
Percent of Usage due to Household Use [Calculate: (2)/(1)]	#VALUE!	(3)
Total Annual Cost of Pollution Control Project	$_____ (4)	(4)
Industrial Surcharges, if any	$_____ (5)	(5)
Costs to be Allocated [Calculate: (4) - (5)]	#VALUE!	(6)
Amount to Be Paid By Households [Calculate: (3) x (6)]	#VALUE!	(7)
Annual Project Cost per Household [Calculate: (7)/Worksheet C, (4)]	#VALUE!	(8)

C. Total Annual Pollution Control Cost Per Household

Annual Existing Costs Per Household [Worksheet C, (5)]	$200	(9)
Total Annual Cost of Pollution Control Per Household [(8) + (9)]	#VALUE!	(10)

Worksheet D-Municipal Preliminary Screener

The Municipal Preliminary Screener indicates quickly whether a public entity will not incur any substantial economic impacts as a result of the proposed pollution control project. The formula is as follows:

Total Annual Pollution Control Cost per Household/Median Household Income X 100

A. Calculation of The Municipal Preliminary Screener

Total Annual Pollution Control Cost Per Household [Worksheet C, (11) or $ (1) Worksheet C, Option A (10)]	$393	
Median Household Income* $ (2) (use CPI to update income number to current year)	$33,669	should be identical to that stated in PER
Municipal Preliminary Screener (Calculate: [(1)/(2)] x 100) %(3)		
B. Evaluation of The Municipal Preliminary Screener	1.17%	
Impact level is (Little, mid-range, large)	Mid-Range	Continue on to secondary test

If the Municipal Preliminary Screener is clearly less than 1.0%, then it is assumed that the cost will not impose an undue financial burden. In this case, it is not necessary to continue with the Secondary Test. Otherwise, it is necessary to continue.

Benchmark Comparison:

Little Impact	**Mid-Range Impact**	**Large Impact**
Less than 1.0%	1.0% - 2.0%	Greater than 2%
Indication of no substantial economic impacts	**Proceed to Secondary Tests**	

Worksheet E-Data Used in the Secondary Test

The Secondary Test is a continuation of the "Substantial" testing procedures. It indicates the community's ability to obtain financing and describes the socioeconomic health of the community. Use the latest data available for the community or other public jurisdiction being analyzed.

A. Data Collection

Data	Potential Source		Value	Source
Direct Net Debt--Debt Issued directly by the local jursidiction (1)	Community Financial Statements Town, County or State Assessor's Office	$_____	$44,923,000	Becky Christians (406) 552-6107, City of Missoula, Assistant Finance Director
Overlapping Debt (such as school districts)? (2)	Community Financial Statements Town, County or State Assesor's Office	$_____	$22,216,000	Becky Christians (406) 552-6107, City of Missoula, Assistant Finance Director
Market Value of Property within the community or service area (3)	Community Financial Statements Town, County or State Assessor's Office	$_____	$4,340,261,600	" "
Bond Rating-(if available) (4)	Standard and Poors or Moody's	_____	AAA-(S&P)	" "
Community Unemployment Rate (5)		_____%	2.9%	Source: Montana Department of Labor and Industry, Research and Analysis Bureau, Local Area Unemployment
National Unemployment Rate (6)				Bureau of Labor Statistics

		4.7% (6)	4.7%	http://www.bls.gov/ (202) 606-6392 Susan Ockert- CEIC extracted from Decision Data resources
Community Median Household Income for 2006 (7)	Montana CEIC	$_____	$33,669	
State Median Household Income (8)	Montana CEIC	$37,307 for State of Montana	$37,307	Susan Ockert- CEIC extracted from Decision Data resources
Property Tax Collection Rate (Indicator of the efficiency of the tax collection system--compares the actual amount collected from property taxes to the amount levied) (9)	Montana CEIC Community Financial Statements	_____%	99.20%	Becky Christians (406) 552-6107, City of Missoula, Assistant Finance Director
Property Tax Revenues (10)	Town, County or State Assessor's Office Community Financial Statements	$_____	$21,856,338	Tax Year 2007 Source: DOR-TPR Mary Craigle
Full Market Value of taxable property	Town, County or State Assessor's Office	$_____	$4,340,261,600	Tax Year 2007 Source: DOR-TPR Mary Craigle

B. Calculation of Indicators

1. Overall Net Debt as a Percent of Full Market Value of Taxable Property

Overall Net Debt (Calculate: (1) + (2)) (11)	$_____	$67,139,000	
Overall Net Debt as a Percent of Full Market Value of Taxable Property (Calculate: [(11)/(3)] x 100) (12)	_____%	1.55%	

2. Property Tax Revenues as a Percent of Full Market Value of Taxable Property

Property Tax Revenues as a Percent of Full Market Value of Taxable Property (Calculate: [(10)/(3)] x 100) (13)	_____%	0.50%	#DIV/0!

Worksheet F- Calculating the Secondary Score

The Secondary Test is designed to build upon the characterization of the financial burden identified in the Municipal Preliminary Screener. The Secondary Test indicates the community's ability to obtain financing and describes the socioeconomic health of the

Remember, if one of the debt or socioeconomic indicators is not available, average the two financial management indicators and use this averaged value as a single indicator with the remaining indicators. Please record the scores in the final column. It will sum the scores and compute an average.

Table 2-1 Secondary Indicators

		Secondary Indicators			Missoula
	Indicator	Weak*	Mid-Range**	Strong***	**Score**
Debt Indicators	Bond Rating (if available)	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) or Baa (Moody's)	3
	Overall Net Debt as Percent of Full Market Value of Taxable Property	Above 5%	2%-5%	Below 2%	**3**
SocioEconomic Indicators	Unemployment	More than 1% above National Average	National Average----4.7%	More than 1% below National Average	**3**
	Median Household Income	More than 10% below State Median	State Median--$37,307	More than 10% above State Median	**1**
Financial Management Indicators	Property Tax Revenues as a Percent of Full Market Value of Taxable Property	Above 4%	2%-4%	Below 2%	**3**
	Property Tax Collection Rate	< 94%	94% - 98%	> 98%	**3**

Enter Bond Rating Score in box at left

* Weak is a score of 1 point
** Mid-Range is a score of 2 points
*** Strong is a score of 3 points

SUM: 16

AVERAGE: 2.67

http://www.epa.gov/waterscience/standards/econworkbook/table21.html

Note: If the applicant is not able to develop one or more of the six indicators, they must provide an explanation as to why the indicator is not appropriate or not available. Since the point of the analysis is to measure the overall burden to the community, the debt and socioeconomic indicators are assumed to be better measures of burden than the financial management indicators. Consequently, if one of the debt or socioeconomic indicators is not available, the applicant should average the two financial management indicators and use this averaged value as a single indicator with the remaining indicators. This averaging is necessary so that undue weight is not given to the financial management indicators.

Assessment of Substantial Impacts Matrix

Table 2-2
Assessment of Substantial Impacts Matrix

	Minicipal Preliminary Screener		
	Less than 1%	1% to 2%	Greater than 2%
Secondary score			
Less than 1.5	?	X	X
Between 1.5 and 2.5	$	?	X
Greater than 2.5	$	**$**	?

Result: For Missoula, the matrix indicates that they can pay for the new pollution control. Thus, a Widespread determination would not be necessary and no varience would be given on economic grounds. However, we will do a Widespread determination anyway for the practice.

X-Cannot pay due to hardship
?-Borderline, undetermined
$-Can pay

Communities falling into either the "X" or the "?" category should proceed to Chapter 4 to determine whether the impacts are also expected to be widespread.

For communities that fall into the "?" category, if the results of both the Secondary Test and the Municipal Preliminary Screener are borderline, then the community should move into the category closest to it. Take, for example, a community that falls into the center box, with a cumulative assessment score of between 1.5 and 2.5 and a percent of median household income (MHI) between 1.0 and 2.0. If the cumulative score was 1.6 and the percent of MHI was 1.8, then the community should be considered to fall into one of the adjacent "X" categories. If results are not borderline, other factors such as the impact on low or fixed income households, the presence of a failing local industry, and other projects the community would have to forgo in order to comply with water quality standards should be considered. Relevant additional information might include information collected from interviews with municipal financial officers, special reports on industry trends that may affect local employers, and specific financial and economic indicators. The State/discharger should provide any additional information they feel is relevant. This additional information will be critical where the matrix results are not conclusive.

DEQ Widespread Criteria - Factors to Consider in Making a Determination of Widespread Social and Economic Impacts

The financial impacts of undertaking pollution controls could potentially cause far-reaching and serious socioeconomic impacts. If the financial tests outlined in Chapter 2 and 3 suggest that a discharger (public or private) or group of dischargers will have difficulty paying for pollution controls, then an additional analysis must be performed to demonstrate that there will be widespread adverse impacts on the community or surrounding area. There are no economic ratios per se that evaluate socioeconomic impacts. Instead, the relative magnitudes of indicators such as increases in unemployment, losses to the local economy, changes in household income, decreases in tax revenues, indirect effects on other businesses, and increases in sewer fees for remaining private entities should be taken into account when deciding whether impacts could be considered widespread. Since EPA does not have standardized tests and benchmarks with which to measure these impacts, the following guidance is provided as an example of the types of information that should be considered when reviewing impacts on the surrounding community.

At a minimum, the analysis must define the affected community (the geographic area where project costs pass through to the local economy), consider the baseline economic health of the community, and finally evaluate how the proposed project will affect the socioeconomic well-being of the community. Applicants should feel free to consider additional measures not mentioned here if they judge them to be relevant. Likewise, applicants should not view this guidance as a check list. In all cases, socioeconomic impacts should not be evaluated incrementally, rather, their cumulative effect on the community should be assessed.

Answer as many of the following questions as possible and see the additional instructions below:

INPUT CATEGORY	**Weight of Importance**	
Define the affected study area or community (1)	Most Important	The City of Missoula wastewater district
Describe the general economic trend in the study area or community--qualitatively or quantitatively. Name the main industry(s) and if any major industries are intending to enter the area or leave the area. What is the current health of that main industry(s)? (2)	Most Important	Missoula's economy is generally booming, and is not feeling the larger effects of the current recession. It's economic output is growing at __% per year which is higher than the state average. Tourism, retail, and construction are the fastest growing industries
Indicate the general population trend in the area. Is the community growing or shrinking? Specifically state if young people are staying in the area or leaving after they graduate school (3)	Most Important	The community population is growing fairly rapidly at __% per year which is above the Montana population growth rate average of __% per year. More young people stay in Missoula than in the rest of Montana.
Describe how the economy in general would be affected, if at all, by having to meet requirements. Potential effects, for example, could be changes in median income and/or unemployment. (4)	Most Important	The economy would hardly be affected by the higher wastewater rates. Median income and employment would not be affected at all. There are enough households in Missoula to affordable cover the new costs
How would the unemployment rate in the study area be affected, if at all, by having to comply with numeric nutrient standards? How would this affect the unemployment rate in comparison to the national average which is 4.7% (Source: Montana Department of Labor and Industry, Research and Analysis Bureau, Local Area Unemployment Statistics compiled by CEIC) ? (5)	Important	The unemployment rate would not be affected

Approximately how many more individuals would become unemployed, if any, as a result of the public entity having to meet numeric nutrient standards? Are there other ample job opportunities to take up the slack (refer to current unemployment rate in Secondary test)? (6)	Important	None
What would be the estimated change in Median Household Income, if any, as a result of having to comply with numeric nutrient standards? Describe qualitatively and/or qualitatively. If any change, how would this affect the Median Household Income in comparison to the state median which is $37,307 (Source: Susan Ockert, CEIC, extracted from Decision Data Resources)? (7)	Important	The median household income would not be affected.
Percent of households below the poverty line in the affected community and a comparison to the state average of 21.6% (8)	Important	19.6%---about 10 percent below state average
What would be the estimated change in (8) as a result of having to comply with water quality standards and would that change the comparison to the Montana average? The Montana average percent of households below the poverty line is 21.6% or 80,556 homes out of 372,190 (Source: U.S. Census Bureau, 2006 American Community Survey, POVERTY STATUS OF MONTANA HOUSEHOLDS: 2006, Susan Ockert, CEIC) (9)	Important	None because income would not be affected
Expected increase in social services in affected community, if any, if water quality standards have to be met. This can be answered as a change in dollars, a change in percent from current expenditures, or qualitatively if no data exists. (10)	Important	Very little to none
If applicable, what would be the estimated change in overall net debt of the municipality as a percent of full market value of taxable property as a result of having to meet numeric nutrient standards? (11)	Important	The change would be an increase of about 25% from the current 1.55% up to just under 2%, which is still a strong number.
What would be the impact on property values within the affected area, if any, from having to meet numeric nutrient standards? (12)	Important	None
What would be the Impact on community and/or commercial development potential in the study area, if any, from having to meet numeric nutrient standards? (13)	Important	None
Is a large percentage of the wastewater treatment plant used by one or a few entities that would be affected by water quality standards? If yes, and these entities closed down as a result of pollution control costs, would significant burden be placed on the rest of the users of that system? (14)	Important	No
Would expenditures on pollution controls to reach attainment have any positive effects on the community? (15)	Important	They would expand room for future development and population increase in the area while maintaining the quality of water in the Clark Fork.

Would increase levels of water quality have any positive effects on the community? (16) See details of this category next sheet		It would maintain current water used on the area waterways.	
If appropriate, would there be any multiplier effects from cost or benefits as a result of having to meeting numeric nutrient criteria? In other words will a dollar lost or gained as a result of the criteria result in the loss or gain of more than one dollar in the study area (e.g. direct and indirect spending)? (17)	Most important	Not enough to be of any concern. Households would have slightly less money to spend on other goods, but the percentage would be small.	
(For non-deg only). In the case of non-degradation, what is the community's majority opinion on growth and/or the entity coming into the town/region and building a facility? What is the community's majority opinion on degradation of the receiving stream's high quality water? (18)	Most Important (non-deg)	_____	what if triggering nondeg is a result of just general growth in the community?
Is there any additional information that suggests that there are unique conditions in the affected community that should also be considered? (19)	Important	No	
Based on the criteria you just filled out and on your own judgement, will this community experience widespread impacts? Please describe how you reached this decision.		No, this community will not experience widespread impacts.	

ARRIVING AT A CONCLUSION: The main question to ask is whether widespread economic impacts are likely to occur in the study area as a result of attempting to comply with numeric nutrient standards? (yes/no) The key aspect of a "widespread determination" is that it evaluate change in the socioeconomic conditions that would occur as a result of compliance (EPA 1995).

The analyst should take into account as many of the factors listed above as possible when making a decision on whether impacts are widespread. The decision should be made based on all appropriate factors in a comprehensive manner (rather than as a checklist). The analyst will use his or her judgement on whether all the factors taken together (including some that may not be on this list) constitute widespread impact. Likewise, applicants should not view this guidance as a check list. In all cases, socioeconomic impacts should not be evaluated incrementally; rather, their cumulative effect on the community should be assessed as a whole. Applicants should feel free to use anecdotal information to describe any current community characteristics or anticipated impacts that are not listed in the worksheet.

The analyst may want to weight some of these factors more than others. In some cases, the results from a single category might be sufficient to determine whether widespread impacts will occur, even if other factors suggest differently. These categories are weighted by how important they are relative to the general idea "widespread" is attempting to address, although the analyst can use their own weights if supported by evidence.

In most cases, impacts at the state level will be relatively minor. If not, then impacts are, BY DEFAULT, widespread

There may be secondary impacts from having to meet numeric nutrient standards (not captured by the primary and secondary tests to the community). Secondary impacts, for example, might include depressed economic activity in a community resulting from the loss of purchasing power by persons losing their jobs or leaving the area due to increased user fees.

Reductions in employment caused by compliance with the water quality standards could be widespread if workers have no other employment opportunities nearby. Impacts may also be significant where the public entity(ies) is a primary producer of a particular product or service upon which other nearby businesses or the affected community depend. The impacts of reduced business activities or closure will be far greater in this case than if the products are sold elsewhere.

Potentially, one of the most serious impacts on the affected community's economy is the loss of employment caused by a reduction in business activity or closure. Applicants should also consider whether the lack of alternative employment opportunities may lead to an increased need for social services in the affected community.

Appendix C-Conceptual Measure of Economic Benefits of Clean Water (Optional)

In many cases, there may be economic benefits that accrue to the affected community from cleaner water. For example, in a rural community where the primary source of employment is agriculture, the reduction of fertilizer and pesticide runoff from farms would reduce the cost of treating irrigation water to downstream users. Another example might be an industrial facility discharging its wastewater into a stream that otherwise could be used for recreational cold-water fishing. Treatment or elimination of the industrial wastewater would provide a benefit to recreational fishermen by increasing the variety of fish in the stream. In both cases, the economic benefit is the dollar value associated with the increase in beneficial use or potential use of the waterbody. The types of economic benefits that might be realized will depend on both the characteristics of the polluting entity and characteristics of the affected community, and should be considered on a case by case basis.

Since the assessment of benefits requires site-specific information, it will be up to States to determine the extent to which benefits can be considered in the economic impact analysis. This determination should be coordinated with the EPA Regional Office. A more detailed description of the types of benefits that might be considered is given in Appendix C. This appendix is not intended to provide in-depth guidance on how to estimate economic benefits; rather, it is intended to give States an idea of the types of benefits that might be relevant in a given situation.

In valuing benefits associated with an ecological resource such as clean water, a basic distinction is made between the intrinsic value of the existence of the resource and its value in use by the human population. Use values are further subdivided into direct or indirect uses. Other valuation concepts arise from the uncertainty surrounding future uses and availability of the resource. A classification of these valuation concepts, along with examples, is presented in Table C-1 below.

C.1 Use Benefits

Estimating the benefits of clean water will depend upon several variables that describe the attributes of the resource and its uses. A waterbody might be used for recreational activities (such as fishing, boating, swimming, hunting, bird watching), for commercial purposes (such as industrial water supply, irrigation, municipal drinking water, and fish harvesting), or for both. Where recreational activities are created or enhanced due to water quality improvements, the public will benefit in the form of increased recreational opportunities. Similarly, the cost of treating irrigation and drinking water to down stream users could be reduced if pollutant discharges were reduced or eliminated in a particular stretch of river.

Direct use includes both consumptive and non-consumptive uses. Consumptive uses can be distinguished from non-consumptive uses in that the former excludes other uses of the same resource while the latter does not. For example, water is consumed when it is diverted from a waterbody for irrigation purposes. With non-consumptive uses, however, the resource base remains in the same state before and after use (e.g., swimming). Human health benefits associated with cleaner water could be consumptive (reduced illness from eating finfish or shellfish) or non-consumptive (reduced exposure to infectious diseases while recreating).

When estimating benefits, it is important to determine whether or not the resource and its uses (in this case clean water) can be considered market or non-market resources and uses (i.e., does a market exist for the resource or its use). For example, commercial fisheries have a market value reflected by the financial value of landings of a particular species. By contrast, no market exists to describe the value individuals receive from swimming. Where market values are available, they should be used to estimate benefits. In the case of water supply, there may or may not be a market for clean water. Some water users may be required to pay for that use as in the case of a farmer paying a regional water board to divert water for irrigation purposes. This will be particularly true in the arid west. By contrast, a manufacturing facility using water for cooling or process water may not pay anything for the right to pump and use water from an adjacent river. For resources with no market value, a number of estimation techniques including the travel cost, estimation from similar markets, and contingent valuation methods have been developed.

While they are conceptually distinct attributes, consumptive use is frequently associated with markets and non-consumptive use is frequently associated with non-market situations. Some resources that are considered market resources, however, may be used non-consumptively. The converse is also true. As an example of the first, a fee may be charged (other than parking) to gain entrance to a state park, however, while a swimmer's use of a lake in the park is not consuming any part of the lake.

Commercial activities that are dependent on clean water which is not directly owned are said to benefit from indirect use. Examples would be a fishing equipment manufacturer's dependence on healthy fish stocks to induce demand for its products or the dependence of property values on the pristine condition of an adjacent water body. Indirect use is also characterized by the scenic views and water enhanced recreational opportunities (camping, picnicking, birdwatching) associated with the quality of water in a water body. Indirect use benefits such as enhanced property values can be estimated using the hedonic price technique. Care should be taken, however, to not double-count benefits. If property values reflect the proximity to and thus use of water, then the value of the use should not be included separately.

C.2 Intrinsic Benefits

Intrinsic benefits include all benefits associated with a resource that are not directly related to the current use of the resource. Intrinsic benefits are represented by the sum of existence and option values. Existence value indicates an individual's (and society's) willingness to pay to maintain an ecological resource such as clean water for its own sake, regardless of any perceived or potential opportunity for that individual to use the water body now or in the future. Contributions of money to save endangered species such as the snail darter demonstrate a willingness to pay for the existence of an environmental amenity despite the fact that the contributors may never use it or even experience it directly.

Option value is the willingness to pay for having a future opportunity to use resources such as clean water in known or as yet unknown ways. In a sense it is a combination of insurance and speculative value. Individuals routinely pay to store or transport something they are not sure they will use in the future because they recognize it would be more costly to recreate the item than to preserve it. In an ecological sense, pristine habitats and wildlife refuges are often preserved under the assumption that plant or animal species which may yield pharmaceutical, genetic, or ecosystem benefits are yet to be discovered. Option value takes on particular importance when proposed development or environmental perturbations are largely irreversible or pollutants are persistent. Intrinsic benefits are difficult to measure due to the level of uncertainty associated with these benefits. The most common approach to estimating intrinsic benefits, however, is the contingent valuation method, which cannot be described in detail within this short overview.

C.3 Summary: Summarize the Water Quality Benefits of this pollution control project

Total valuation of clean water benefits includes all use and existence values as well as option value. The proper framework for estimating the economic benefits associated with clean water consists of 1) determining when damage first occurs or would occur; 2) identifying and quantifying the potential physical/biological damages relative to an appropriate baseline; 3) identifying all affected individuals both due to potential loss of direct or indirect services or uses, and to potential losses attributable to existence values (may include projections for growth in participation rates); 4) estimating the value affected individuals place on clean water prior to potential degradation; and 5) determining the time horizon over which the waterbody would be degraded or restored to some maximum reduced state of service (if ever), and appropriately discounting the stream of potential lost services. If evaluating an improvement in water quality, the procedures are the same except that benefits gained are measured.

Table C-1: Categories of Use Benefits

Direct	Indirect	Intrinsic
Consumptive:	Fishing Equipment Manufacturer	Option Value (access to resource in future)
Market Benefits	Property Values	Existence Value (knowledge that services of resource exist)
Industrial Water Supply	Aesthetics (scenic views, water enhanced recreation)	
Agricultural Water Supply		
Municipal Water Supply		
Commercial Fishing		
Non-Market Benefits		
Recreational Fishing		
Hunting		
Industrial Water Supply		
Agricultural Water Supply		
Municipal Water Supply		
Non-Consumptive:		
Swimming		
Boating		
Human Health		

Non-Degredation for a Public Entity

Antidegradation is not a "no growth" rule and was never designed nor intended to be one. It is a policy that allows the public to make decisions about important environmental actions. Where the State intends to provide for development, it may decide that some lowering of water quality in "high-quality waters" is necessary to accommodate important economic or social development. Any such reduction in water quality, however, must protect existing uses fully and must satisfy the requirements for intergovernmental coordination and public participation.

To determine if water quality can be lowered for a new pulbic development, the same tests are used as in this worksheet. However, the question is slightly different.

Question:
(1) Will the pollution controls needed to maintain the high-quality water interfere with the proposed public development? (Analogous to secondary test for substantial effects)
(2) Is the proposed public development important economically and socially to the study area? (Analagous to Widespread Impacts Test)

The tests used to demonstrate interference and importance are the same as those used to demonstrate substantial and widespread. The difference is, however, that an antidegradation review considers situations that would improve the current economic condition.

If the answer is no to either 1 or 2 above, then the analysis is over---no degradation of water quality is necessary.
If the answer is yes to both questions, then the tests must show that the public development interfered with by the pollution controls necessary to prevent degradation *is* an *important* economic and social development.

To answer question (1), please complete Worksheets A through E, and the Substantial Impacts Matrix.
To answer question (2), please complete Worksheet M and the DEQ Widespread Criteria worksheet.
Complete the summary information on tab X.
An antidegradation review must determine that the lowering of water quality is necessary in order to accommodate important economic or social development in the area in which the waters are located.

While the terminology is different, the tests to determine substantial and widespread economic impacts (used when removing a use or granting a variance) are basically the same as those used to determine if there might be interference with an important social and economic development (antidegradation). As such, antidegradation analysis is the mirror image of the analyses described in Chapters 2, 3 and 4. Variances and downgrades refer to situations where additional treatment needed to meet standards may result in worsening economic conditions; while antidegradation refers to situations where lowering water quality may result in improved social and economic conditions.

When performing an antidegradation review, the first question is whether the pollution controls needed to maintain the high-quality water will interfere with the proposed development. If not, then the lowering of water quality is not warranted. If, on the other hand, the pollution controls will interfere with development, then the review must show that the development would be an important economic and social one. These two steps rely on the same tests as the determination of substantial and widespread impacts.

The analytic approach presented here can be used for a variety of public-sector and private sector entities, including POTWs, commercial, industrial, residential and recreational land uses, and for point and nonpoint sources of pollution.

Figure 5-1:
Antidegradation Review